

Cybergenetics TrueAllele® Disclosure Materials

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This document provides an overview of the case DVD content. Each section describes a top-level folder on the optical disc.

Reliability

This folder contains materials introduced in hearings or trials. The information describes how TrueAllele works, how it has been validated, and how it has been used. Below is an overview of the subfolders.

Background Reading

These documents provide background information on DNA, its interpretation, and the TrueAllele Casework System. The documents help aid in understanding TrueAllele's role in interpreting DNA mixture evidence.

Validation Paper

The folder contains 8 published TrueAllele validation papers. These published papers show TrueAllele's peer-reviewed reliability on both laboratory synthesized samples and casework data from the field. Understanding how TrueAllele performs on both types of data helps establish its capability on different types of DNA mixtures.

Validation Study

This folder contains some additional unpublished validation studies performed by both Cybergenetics and other laboratories. The studies demonstrate TrueAllele's reliability using diverse data sets. Some studies were conducted independently of Cybergenetics. The validation ReadMe provided shows the main points of each study.

Forensic Application

This folder contains documents that describe how TrueAllele has been used in different forensic disciplines. TrueAllele has been used to identify human remains, and to create standards for calibrating forensic instruments.

Regulatory Approval

Several guiding bodies for forensic labs have approved TrueAllele for use in casework. Additionally, TrueAllele complies with guidelines issued by the Scientific Working Group for DNA Analysis Methods (SWGDM). Documents describing these approvals are included in this folder.

Method Reports

This folder contains Cybergenetics current procedure for standard casework processing. It also has documents that describe TrueAllele's methods.

General Acceptance

The methods underlying TrueAllele software are generally accepted in the relevant scientific community. Documents in this folder show that other scientists have written about TrueAllele or similar systems, or have cited TrueAllele papers in their own work.

Related Systems

This folder contains papers that describe software similar to TrueAllele. These other computer systems show that the TrueAllele approach is widely used, and generally accepted in the forensic community.

Admissibility Rulings

This folder contains TrueAllele admissibility rulings from different courts. These rulings provide legal justification or precedent for TrueAllele's acceptance in Frye and Daubert jurisdictions.

Legal Commentary

Lawyers, including defenders, have written articles about TrueAllele. Some of the articles describe the system's objectivity in how the computer assesses DNA evidence.

Scientific Development

This folder contains articles that show the evolution of the TrueAllele system. Using computers for DNA interpretation is not new.

Other Papers

These articles describe principles underlying the TrueAllele System. They show that the computer methods are well-established in science.

Validation

The validation folder contains TrueAllele validation papers, studies, data and other supporting information regarding validating the TrueAllele method.

1-Studies

This folder contains 38 TrueAllele validation studies, including 8 peer-reviewed papers. The ReadMe table provided in this folder shows all of the articles, the authors, type of study and major topics in each study. A list of citations is also provided.

Validation establishes the reliability of a method. The provided studies quantify how *sensitive* TrueAllele is in identifying people who have contributed their DNA to biological evidence. Some measure how *specific* the system is in excluding people whose DNA is not in the evidence. They also describe how the computer is *reproducible* in getting the same answers on the same data. Other validation axes are also explored.

2-Data

This folder contains raw data files (.fsa) used in a published TrueAllele validation study. This data allows an independent scientist to test the TrueAllele system and make comparisons to other studies.

3-Presentations

This folder contains a PowerPoint presentation describing the Virginia TrueAllele validation study. This presentation is useful for admissibility hearings in presenting a validation in a straightforward way.

4-CPI

This folder contains information regarding the combined probability of inclusion (CPI) method. These resources are useful in making comparisons between computer and human interpretation methods.

Tutorial Videos

This folder contains video files of lectures that cover the theory and application of the TrueAllele System.

1-Introduction and Methods

This folder contains presentations that provide a basic introduction to TrueAllele and its methods. These videos are used in Cybergenetics TrueAllele training courses.

01_Biology_and_Information.mp4

This lecture provides basic DNA biology and an introduction to the likelihood ratio (LR) that balances DNA identification with coincidence.

02_Bayesian_Belief_Update.mp4

When there is uncertainty, our beliefs are expressed as probabilities. This lecture visualizes Bayesian update, showing how TrueAllele expresses genotypes with probabilities.

03_Inclusion_Genotype_and_LR.mp4

This lecture illustrates how Bayesian update is applied in DNA identification science to give better understanding of the TrueAllele match statistics.

04_Stochastic_Effects.mp4

This lecture shows how quantitative modeling exploits data variation to preserve DNA identification information, while qualitative thresholds introduce error and discard information. This informs others how TrueAllele can handle variations in data.

05_Quantitative_Data_Modeling.mp4

This lecture shows how using a quantitative likelihood function can preserve DNA identification information and how TrueAllele can use all of the data to narrow down the list of possibilities given some considerable probability for every variable examined.

06_Mixture_Weight_and_Inference.mp4

This lecture shows how computers can refine human insight. It also shows how generally accepted computer sampling can account for all the DNA variables.

2-How TrueAllele Works

This folder contains presentations describing how the TrueAllele technology works. The videos are used in Cybergenetics TrueAllele training courses.

01_TrueAllele_interpretation_of_DNA_mixture_evidence.mp4

The talk describes the system's operation in the context of a criminal case, proceeding from DNA mixture interpretation through trial testimony.

02_TrueAllele_Casework_at_Probabilistic_Software_Workshop.mp4

This talk shows how TrueAllele recovers DNA identification information from "uninterpretable" DNA evidence using a serial rape case as an example.

03_How_TrueAllele_Works_Part_1.mp4

This talk focuses on genotype modeling and the likelihood ratio.

04_How_TrueAllele_Works_Part_2.mp4

This talk focuses on how TrueAllele handles degraded DNA and allele dropout.

05_How_TrueAllele_Works_Part_3.mp4

This talk focuses on how TrueAllele solves kinship, paternity and missing persons.

06_How_TrueAllele_Works_Part_4.mp4

This talk focuses on how TrueAllele provides genotype databases to aid DNA investigations.

3-Continuing Legal Education

This folder contains additional lectures concerning legal topics.

01_Mix_and_match-Getting_comfortable_with_DNA_reporting.mp4

This talk shows how to explain TrueAllele in court, using demonstrative aids and a case report. The aids introduce DNA mixtures and their STR data, describe how the computer separates mixture data into genotypes, and show how comparing genotypes calculates a match statistic.

02_Forensic_Science_and_Criminal_Law-Cutting_Edge_DNA_Strategies.mp4

Crime laboratories have been reporting on DNA mixture evidence using unreliable match statistics. This talk discusses how to challenge unreliable match statistics in court.

03_TrueAllele_interpretation_of_Allegheny_County_DNA_mixtures

These connected talks show TrueAllele's use in criminal cases for interpreting DNA mixtures. The focus is on explaining DNA evidence and using it in court.

01_TrueAllele_interpretation_of_Allegheny_County_DNA_mixtures.mp4

02_Murder_in_McKeesport.mp4

03_Nigerian_serial_rapist.mp4

04_DNA_database.mp4

04_Challenging_DNA_Evidence

This set of lectures shows how modern DNA evidence has become more challenging. Mixtures of multiple people, often with low amounts of DNA, are more prevalent. The resulting DNA data pose interpretation challenges that sophisticated computing can solve, but simpler analysis cannot. These scientific challenges translate into new ways of presenting, challenging, and defending DNA match statistics in the courtroom. This course uses criminal cases with interesting DNA evidence to illustrate the strategies.

01_DNA_Mixture_Evidence.mp4

02_Rape_Case_Example.mp4

03_Comparing_Interpretation_Methods.mp4

04_Virginia_TrueAllele_Validation.mp4

05_Challenging_Mixture_Interpretation.mp4

06_TrueAllele_Solves_Crime.mp4

VUler Software

This folder provides TrueAllele® software for reviewing DNA evidence. The folder contains installation instructions, installers, license key and other information regarding the Visual User Interface (VUler™) and TrueAllele software.

1-Instructions

This folder contains instructions for installing the read-only VUler™ software and using the Download module (read-only version of the Report module) to review results.

Installation_Guide.pdf

This document describes how to install the provided version of the TrueAllele software.

TrueAllele_Download_Module.pdf

This document describes how to use the provided VUler software to review TrueAllele results from cases and validations.

2-Manuals

This folder contains the VUler manuals for the current version of the software. These manuals describe the workflow (1, 2), various VUler modules (3, 4, 5, 6, 7, 8), a tutorial (9), database application (10), specificity feature (11), non-contributor feature (12), kinship application (13), and likelihood ratio match statistic explanation (14).

01-WorkFlow.pdf

02-Getting_Started.pdf

03-Analyze.pdf

04-Data.pdf

05-Request.pdf

06-Review.pdf

07-Report.pdf

08-Tools.pdf

09-Tutorial.pdf

10-Database.pdf

11-Specificity.pdf

12-Noncontributor.pdf

13-Kinship.pdf

14-Likelihood_Ratio.pdf

3-Installers

This folder contains VUler installers for both Macintosh and Windows (32-bit and 64-bit) computers. This information allows the (read-only) VUler software to be installed by any party to review TrueAllele results.

4-License

This folder has a license key that allows a party to use the read-only VUler software. The key expires 90 days after activation.

5-Cloud

This folder invites opposition defenders or prosecutors to process their own DNA data using the TrueAllele Cloud at no cost for use in a criminal proceeding.

6-Source code

This folder contains information on how defense experts can inspect TrueAllele source code.

Case Files

This folder contains case specific files. These include the data files, TrueAllele report, case packet, and PowerPoint demonstrative aid.

1-Sequencer files

This folder contains the data files provided by a DNA laboratory that were used in TrueAllele analysis.

2-TrueAllele report

This folder contains the TrueAllele case report.

3-Curriculum vitae

This folder contains the curriculum vitae of the Cybergenetics analysts and scientists who worked on the case.

4-Case packet

This folder contains the case packet that contains supporting information for the conclusions found in the TrueAllele case report. Case notes, data tables and images, request information, genotypes used to calculate match statistics, and the match statistics for all comparisons are included in this file.

5-Demonstrative aid

This folder contains a PowerPoint demonstrative aid that explains TrueAllele results.

6-VUler files

This folder contains TrueAllele .tas computer files for all TrueAllele results. These files can be loaded into the provided VUler software (Download module) to review case results.

7-Process files

This folder contains other electronic data files that were produced during TrueAllele processing.